

REMARKS**I. About the Amendments**

The Amendment to Claim 1 recognizes the Examiner's argument with respect to the lack of a clear requirement that the non-acetal component have a lower melt viscosity than the polyacetal component. Applicants claim, as amended in series, now explicitly recite the relative melt viscosities of the non-acetal and the polyoxymethylene components. The Applicants do not consider this a further limitation of the claims since the added condition was implicit in the original claims, with respect to the reference to adhesion. The amendment specifically addresses the Examiner's contention that the Applicants' argument is not commensurate with the claims.

Support for the additional polymers added to claim 1 can be found in claim 8 as originally filed; page 6, lines 12-16; page 9, lines 29-34; and page 15, lines 14-27.

Support for newly added claim 16 can be found on page 6, lines 12-16.

II. Traversal

All pending claims are rejected as obvious under 35 USC 103(a).

In the Advisory Action of November 11, 2006, the Examiner maintained that it is not necessary that the motivation to combine to references be solve the same problems the Applicants were motivated to solve. The Applicants agree in general with the Examiner's statement, but respectfully disagree with the overall conclusion of the Examiner as applied to the present application. While the motivation to combine the references does not have to be the same as the Applicants' motivation, the finding of obviousness does require that the references offer some guidance in combining the teachings in a way that one of ordinary skill in the art would obtain the Applicants' claimed invention. In the present case, the motivation to combine is very much related to the invention/solution obtained by the Applicants. The Applicants were motivated to solve the problem of a lack of adhesion at the surface of articles comprising POM.

It is generally known that POM compositions do not have good adhesive properties. There is a high level of crystallinity in a POM polymer, and therefore POM exhibits lesser adhesion than amorphous or liquid polymers that are better able to swell a polymer surface and cause entanglement at the interfacial surface. It is also known that POM compositions can be readily degraded and are therefore are compatible with a limited range of materials. Because of the limited range of materials that can be compatible with POM without causing degradation there are few materials that can be combined with POM and improve adhesion as described in the present application.

The solution to the problem was not just a matter of putting together a combination of polymers. The solution, and thus the invention, relies upon a particular combination that

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results in having more adhesive character at the surface of what one of ordinary skill would expect to be an otherwise "non-stick" surface. The guidance to combine the components in a manner to improve adhesion is absent from the references. There are numerous ways that the teachings of the references could be followed that would not provide the Applicants' claimed invention. Therefore, combining the references -- without the motivation of increasing surface adhesion -- does not necessarily lead one of ordinary skill to the Applicants' claimed invention. While the motivation to combine may be any that is suggested by the references, it only stands to reason that one of ordinary skill looking to the references to obtain a composition having improved surface adhesion would not be guided to combine the references in the very specific manner provided and required by the Applicants' claims. Therefore the Applicants respectfully submit that the claimed invention is not obvious.

With regard to the unexpected results, the adhesive properties of the claimed invention are exemplified in the specification. This improvement is shown relative to comparative examples and is therefore not speculative. There are no such observations of improved adhesion to be obtained from the references, presented by the Examiner as the closest prior art. In fact, there is not even a mention of the possibility of improving surface adhesion and it is therefore clear that the Applicants' results of improved adhesion are surprising in view of the teachings of the closest prior art.

III. Rejections under 35 USC 103(a)

A. Claims 1-5, 8 and 9 were rejected under this provision as obvious over U.S. Pat. No. 5,237,008 to Kosinski ["Kosinski"] in view of Kuduo (US 6,930,145).

The Applicants thank the Examiner for the clarification of the new grounds for rejection by telephone, on September 14, 2006. The Examiner states that one would have been motivated to modify Kosinski in order to improve the impact resistance, heat stability, and antistatic properties as taught in Kuduo.

The Examiner maintains the rejection is appropriate in view of the newly cited reference. However, the Applicants respectfully disagree with the new grounds of rejection. The Applicants note that one of the primary objectives of the present invention is to obtain a polyoxymethylene (POM) composition having increased surface adhesion in order to improve adhesion to other surfaces (see, for example, page 1, lines 27-31).

The Examiner relies on Kosinski, even though Kosinski teaches the use of linear low density polyethylene (LLDPE), which is not a non-acetal polymer of the presently claimed composition. Applicants previously noted that the Examiner's consideration of LLDPE as "at least one additional non-acetal polymer of claim 5" in paragraph 7 of the present office action is not understood in view of the limitations to Claim 1. Claim 1 discloses a closed list of non-acetal polymers included in the scope of the claimed invention, and LLDPE is not listed.

Since Claim 5 is dependent from Claim 1, it was not understood why the Examiner considers LLDPE a claimed "non-acetal polymer" in spite of the limitation of Claim 1. In the Advisory Action of November 11, 2006, the Examiner clarified that the polyamide of Kuduo, not the LLDPE of Kosinski was relied upon to read on the claimed non-acetal polymer of Claim 1.

The Applicants thank the Examiner for the clarification, but respectfully contend that there is still no motivation for one of ordinary skill to combine the references in the manner suggested by the Examiner. As noted hereinabove, one of the primary objectives of the claimed invention is to provide an article having improved surface adhesion and the Applicants respectfully disagree with the Examiner's suggestion, that is, that improving impact resistance, antistatic properties, or heat resistance would provide the motivation to combine the references and maintain that the presently claimed invention is not obvious over the cited references because the references do not teach or suggest that a POM composition as claimed would be (a) stable and (b) have improved surface adhesion. The references are silent with respect to surface adhesion.

Kosinski describes POM compositions to which 0.2 to 3 weight percent of LLDPE have been added to improve elongation and makes no mention of the use of other thermoplastic polymers, such as those claimed in the present invention. Nor does Kosinski disclose the use of acid-modified LLDPE. In fact, Kosinski stresses the importance of using linear low density polyethylene for the observed elongation improvement. (See the Background Art section (col. 1, line 47 to col. 2, line 43) and Control Example C2, where the use of low density polyethylene (LDPE) "had essentially no effect on the elongation of the polyoxymethylene.") Furthermore, in his sole mention of acid-modified polyolefins, Kosinski states that "U.S. Pat. No. 4,670,508 discloses that the inclusion of between 10-30 weight percent of ultra-high molecular weight polyethylene, or a maleic anhydride modified version thereof, into polyoxymethylene results in a decrease in the elongation at break of the polyoxymethylene from 24% to less than 10%." Thus Kosinski clearly *teaches away* from the use of any polyolefins other than linear low density polyethylene (LLDPE).

Kuduo, on the other hand, discloses a POM resin composition containing both a polyamide elastomer and an acid-modified olefinic resin. The composition has improved impact resistance and antistatic properties. A wide variety of olefin resins may be acid modified (see col. 5, lines 15-36), and no mention is made of the use of LLDPE. In fact, the polyethylene-based acid-modified olefinic resins of the examples are all derived from low density polyethylene (LDPE) (see c-1 through c-3 and c-6 through c-11 on col. 11, line 50 to col. 12, line 27).

Given that Kosinski stresses the importance of using a particular polyolefin (LLDPE) in his invention and teaches away from use of others, one skilled in the art would have had no reason to imagine that the use the particular combination of a variety of acid-modified olefinic resins and polyamide elastomers taught by Kuduo would have had a positive effect on the properties of the composition of Kosinski. In fact, the opposite is likely true; because

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Kosinski teaches away from the use of any polyolefins other than *linear* low density polyethylene (LLDPE), one skilled in the art would have had reason to believe that the use of the acid-modified olefinic resins and polyamide elastomers of Kuduo in the compositions of Kosinski would result in no improvement in elongation properties and might well significantly adversely effect such properties. Thus one skilled in the art would have had no motivation to combine the teachings of Kuduo with those of Kosinski to obtain improved physical properties, let alone improved adhesion of a layer to a POM substrate.

Furthermore, the acid groups of the acid-modified olefinic resins of Kuduo react with the polyamide (e.g., see col. 5, lines 43-49) to improve compatibility. In the present application the Applicants discuss how surface adhesion is improved in the present invention by including a component that has a melt viscosity that is lower than the melt viscosity of the POM. As such the lower viscosity component moves towards the area of high shear during processes such as injection molding, i.e., towards the walls of the mold (the surface of the POM article. However, as is known to those skilled in the art, acid modification of a polyolefin and its subsequent reaction with polyamide would be expected to increase the melt viscosity of the polyolefin and polyamide components which would therefore would move away from the area of high shear (the surface), and thus these additives would not be expected to improve the surface adhesion of the POM article.

Therefore any teaching or suggestion for incorporating acid-modified olefinic resin and polyamide elastomer in POM compositions teaches away from the presently claimed invention since the modified polyolefin-polyamide reaction products would be expected to migrate away from the surface, where the improvement to adhesion desired. The courts have consistently held that teaching away by a reference is a secondary indicia of non-obviousness

Thus, the Applicants contend that: (1) it would not be obvious to modify Kosinski to incorporate the teachings of Kuduo when one of ordinary skill is looking to improve adhesion in an article comprising POM; and (2) even if obvious to combine, the references do not provide one of ordinary skill in the art the solution presented by the Applicants.

B. Claims 1, 5, 8, 9 and 11 were also rejected under this provision as obvious over Jap. App. Pub. No. 2002192663A ["Polyplastics"] in view of Kuduo.

Paragraph 8 of the Office Action states that Polyplastics teaches an intermediate layer with a layer of polyolefin and a layer of polyoxymethylene on either side of it, with each layer having a specific ratio of polyolefin to the polyoxymethylene. The Examiner uses similar reasoning as with the previous rejection for the combination of Polyplastics with Kuduo.

Due to the similarity of the reasoning used by the Examiner to the reject these claims, the Applicants apply similar arguments to those presented above in response. There is no motivation to combine the references as suggested by the Examiner. Therefore, it would not

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be obvious to combine the references and, even if so combined, the combination would not provide one of ordinary skill the presently claimed invention.

C. Claim 14 was rejected as obvious over Kosinski in view Kuduo further in view of US Pat. No. 3,813,212 to Shofner et al. ["Shofner"].

Applicants maintain their arguments with respect to the Kosinski reference, in combination with Kuduo. Further, Applicants provide arguments with respect to Shofner.

The Examiner contends that Shofner teaches to flame treat a thermoplastic polymer prior to lamination in order to improve adhesion, and that this teaching in combination with the previously described references obviates Claim 14. For the reasons discussed above, the combination of Kosinski and Kuduo does not disclose the claimed invention, and Shofner does not cure the stated deficiencies. The combination cannot support a *prima facie* case of obviousness and Applicants respectfully request reconsideration and withdrawal of the rejection.

D. Claim 1, 5, 7 and 9 were rejected under this provision as obvious over Jap. Pat. No. 2002309064 to Nakamura in view of Kosinski.

Nakamura is an English abstract of a Japanese patent. It discloses that its technical solution is to provide a composition comprising a polyoxymethylene resin, a styrene resin, a polycarbonate resin and a polyolefin resin having excellent dimensional stability, mechanical properties such as impact resistance and thermal stability and giving a molded article having excellent surface state. Kosinski is a U.S. patent having a technical solution to provide polyoxymethylene compositions "having increased elongation at break" (Kosinski, col. 1:37-38 and 43-46).

The technical solution of the present invention is to provide a substrate comprising polyoxymethylene and at least one non-acetal thermoplastic polymer in order to promote adhesion between the substrate and a layer adhered to it. To the point, the specification discusses that articles previously made from polyoxymethylene exhibit high stiffness, strength and solvent resistance, but because of their highly crystalline surface, they also have "low levels of adhesion". This makes it "difficult if not impossible to readily paint, glue, or print on such surfaces, overmold such articles with thermoplastic polymers or adhere some other type of layer to the surface of the substrate" (spec., page 1:27-32). Also, "polyoxymethylene based substrates have low levels of adhesion at their surface", which makes it difficult to fashion layered articles for commercial purposes (spec., page 2:32-35). Moreover, the examples and comparative examples (see Tables 1, 3, and 4) demonstrate that substrates comprising polyoxymethylene and at least one non-acetal thermoplastic polymer have significantly better adhesion to other materials than substrates comprising polyoxymethylene without at least one non-acetal thermoplastic polymer.

Neither Mura nor Kosinski hints, suggests or contains even a throw-away statement that remotely points to the recited and disclosed technical solution of the present invention, e a polyoxymethylene blend substrate that promotes adhesion between the substrate and at least one layer adhered to it, thereby allowing application of a coating or paint, etc. (spec., pg. 1:13-15; claim 1). The motivation for putting together Kosinski with Mura could not have come from within the Kosinski-Mura combination but could only have arisen from a backwards application of the technical solution recited in the claims. In effect, Kosinski was glommed onto Mura to create a combination solely because Kosinski supplies an art reference that discloses laminating polyoxymethylene layers to other layers. Kosinski cannot and does not teach anything about an article that has enhanced adhesion between the polyoxymethylene substrate and a layer adhered to it, as recited in the claims.

E. Claims 1, 5, 7 and 9-13 were rejected under 103(a) as obvious over Jap. Pat. No. 02027615 ["Gawa"] in view of Mura.

The Office Action asserts that even though Gawa does not teach that the polyoxymethylene layer should comprise the claimed composition, Gawa does teach a laminate of 2 insulating layers, the first of which comprises conductors and polyoxymethylene and the second layer comprises polyoxymethylene. Mura is asserted to teach a composition comprising 100 pbw polyoxymethylene and 0-100 pbw of a polycarbonate resin. The Office Action asserts that the substitution of the Mura resin for the polyoxymethylene taught in Gawa would be obvious, and that motivation for such substitution "would have been to improve the impact resistance, dimensional stability, and mechanical properties of said laminate.

As discussed above, the technical solution of the present invention is to provide a laminated substrate comprising polyoxymethylene and at least one non-acetal thermoplastic polymer to promote adhesion between the layers. Nothing in either Gawa or Mura individually or in combination relates to or teaches about improved adhesion of polyoxymethylene substrates. Moreover, the combination suggested by the Examiner has nothing to do with the invention as claimed, with its technical merits. The Applicants suggest that the Examiner is using hindsight reconstruction in an attempt to construct the Applicants' claimed invention from the references. There is no suggestion in either of the references for a combination motivated to improve surface adhesion. In fact, the Examiner continues to suggest that the motivation for combining the references is to improve properties that the Applicants have not even mentioned or measured in describing their own invention. The suggestion to combine the references must come from the references themselves, and must also provide the Applicants' claimed invention. The Examiner has not provided *prima facie* evidence that the article claimed by the Applicants would be obvious from the cited references. The Applicants therefore respectfully request that the Examiner reconsider the rejection and withdraw same in view of the Applicants' arguments.

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CONCLUSIONS

In view of the foregoing, allowance of the above-referenced application is respectfully requested.

Respectfully submitted,



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